

UPON THE ADMINISTRATION OF BISMUTH IN THE SOLUBLE FORM.

BY CHARLES R. C. TICHBORNE, F.C.S.

Under the name of Liq. Bismuthi there has been introduced to the notice of the Faculty a preparation, which purports to possess great advantages over the ordinary basic nitrate. The desirable points in this preparation are—first, its solubility; second, its slight taste; and third, its alkalinity. It has also the peculiarity of not being precipitable by water.

I felt the desirability of such a mode of exhibiting bismuth, and therefore made an analysis of the solution for my own information; and as it possesses certain phases of interest, I now take this opportunity of placing it before the members of the Pharmaceutical Society.

A qualitative analysis elicited the following:—The solution contained bismuth, citric acid, and ammonia; not a trace of nitric acid could be detected in the solution. Liq. Bismuthi is therefore probably a solution of a basic salt, having a composition analogous to $3\text{MO} \cdot \text{Ci} + \text{MO}$; one of the bases, MO , being replaced by BiO_3 : it is made from the recently precipitated and well-washed oxide. From the peculiarity of having to deal with an alkaline bismuthic solution, direct precipitation with sulphide of ammonium was employed to determine the amount of bismuth present; this gave, on washing and drying, 0.327 grammes of BiS_3 in the fluid half-ounce, which represents 1.114 grains of the teroxide as being present in the drachm. Now, although the circular which accompanies the Liq. Bismuthi states that ʒj is equivalent to a full dose (fifteen to twenty grains) of the insoluble trisnitrate, I do not think such can be the case. The idea evidently is that the metal, when in the soluble form, is much more active than the ordinary insoluble modification, and there can be no doubt that it is so to a certain extent; but I should consider three grains to the drachm as the minimum dose: even more than this quantity may be easily introduced into such a solution as the above. The following is probably the mode pursued in making this solution:—430 grains of metallic bismuth are dissolved in a sufficient quantity of nitric acid, and this solution of ternitrate of bismuth is then precipitated with ammonia, and the resulting hydrated oxide well washed; 480 grains of citric acid are then exactly neutralized with ammonia, and the moist oxide is gradually added to the boiling solution of citrate of ammonia. The oxide is slowly but perfectly taken up. Ammonia is slightly evolved during the boiling, (probably from the decomposition of the citrate of ammonia *per se*,) but the solution becomes slightly acid, and remains so until the completion of the process. The solution

is then neutralized with ammonia, and the whole is made to measure one pint. This solution will contain three grains of Bi O_3 to the 5j. It is more elegantly made by dissolving the citrate of bismuth in citrate of ammonia.*

Tartaric acid has also a similar action upon bismuth.

There seems to be a limit to the solubility of chemically pure citrate of bismuth; but the solubility is wonderfully increased by the presence of mineral acids. This is, no doubt, due to the greater solubility of the salts formed by the latter acids in citrate of ammonia.

The reactions of this bismuthic solution are as follows:—

Ammonia and carbonate of ammonia give no precipitate. Potash and soda, or the carbonates of these alkalies, give precipitates insoluble in an excess of the precipitant. Nitric, sulphuric, and hydrochloric acids give precipitates soluble in an excess of the respective acids, and reprecipitable on neutralization with ammonia. These precipitates are also soluble on the further addition of ammonia. Water gives no precipitate. Sulphide of ammonium throws down the whole of the bismuth as sulphide.

As the reactions of citric and tartaric acids are at present little known, it is my intention to investigate the matter further, particularly with a view to its analytical bearing; but in the meantime, I place before you the results of my investigation of the Liq. Bismuthi.

* Citrate of bismuth is a very insoluble salt, got by the double decomposition of citrate of potash or soda, and ternitrate of bismuth. The citrate, as made in this manner, is extremely soluble in ammonia, or a solution of citrate of ammonia.

49 DAWSON-STREET, AND

60 RICHMOND-STREET, SOUTH,
Dublin, 15 of Dec 1863

DR. EVANS' respects to



and begs to submit to his notice the *Hydrastis Canadensis*, an American plant possessing some valuable properties. Dr. E. solicits the favor of a trial to test its efficacy as a Disinfectant and Palliative in Cancer. It has been found by some of his medical friends peculiarly serviceable in removing the pain and destroying the fœtor of the discharges of open Cancer, and affording to the sufferer much quiet and repose, so much needed in that painful disease.

Dr. E. has the pleasure of transcribing a letter he has received from Mr. Smyly, Surgeon of the Meath Hospital, corroborative of its value, which he here subjoins :

8 MERRION-SQUARE, NORTH,
December 9th, 1863.

MY DEAR DOCTOR,

I am happy to hear that you have got a supply of the *Hydrastis*, as I should wish to prescribe it in cases of open Cancer, having seen very beneficial results from its use.

I attended a lady last summer who died of Cancer of the breast, but who from the time she first applied the infusion of *Hydrastis* was relieved from pain, and all disagreeable factor was removed from the discharges. She continued the application for many months, always spoke in the warmest terms of the benefit she received from the application, and could not be induced to try any other. I should think that when the virtues of the *Hydrastis* are better known it will come into general use.

Believe me to be,

Yours very truly,

JOSIAH SMYLY,

Vice-President R.C.S.I., Senior Surgeon to the
Meath Hosp. and Co. of Dublin Infirmary.

It occurred to Dr. E. that it might be equally beneficial in all diseases involving mucous surfaces, in ulcers of the Vagina, Uterus, and Rectum, and also in dressing Stumps after amputation: for this purpose he respectfully directs your attention to it.

MODE OF ADMINISTRATION AND USE.

Two drachms of the Powder infused in sixteen ounces of cold distilled or cold boiled water for twenty-four hours, stirred occasionally, and then strained through calico.

To Ulcers—a piece of soft lint saturated with it, and frequently applied.

To internal Ulcers it can be injected three or four times a day.

For irritable Ulcers of the Stomach—a tablespoonful may be given three or four times a day.

The only Powder upon which implicit reliance can be placed is Keith and Co.'s, of New York, with which Dr. E. is supplied.



